National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

Reply to Attn of: IS

MAR 20 2001

Mr. Karsten Beneke
German Aerospace Center (DLR)
Königswinterer Straße 522-524
D-53227 Bonn
Germany

Dear Mr. Beneke:

The National Aeronautics and Space Administration (NASA) and the German Aerospace Center (DLR) have a mutual interest in pursuing cooperation on the Solar Terrestrial Relations Observatory (STEREO) mission. The purpose of this letter is to establish an Agreement between NASA and DLR (hereinafter, "the Parties") to address our cooperation on the STEREO mission.

STEREO is a major mission in the NASA Solar Terrestrial Probes Program within the NASA Sun-Earth Connection theme in the Office of Space Science. STEREO will unveil the Sun in three dimensions for the first time. Its objective is to address the origin, evolution and interplanetary consequences of one of the most massive disturbances in our solar system called the coronal mass ejection (CME). This will be achieved by sending two identically instrumented spacecraft, both at 1 Astronomical Unit orbit around the Sun, but one flying well ahead of the Earth and one behind the Earth.

The instrument suite for STEREO will characterize the CME plasma all the way from the solar surface to the orbit of the Earth. These instruments will measure physical characteristics of CMEs with remote sensing and local sensing instruments, allowing scientists to determine solar origins of CMEs, their propagation into the interplanetary medium and ultimately their consequences on Earth's magnetic field. By viewing CMEs in three dimensions, STEREO will be able to pinpoint their speed and distance from Earth, and thus more accurately time the arrival of the plasma cloud at the Earth.

The NASA Headquarters Office of Space Science solicited proposals for science participation in the STEREO mission including the opportunity for international collaboration in April 1999, in Announcement of Opportunity (AO) 99-OSS-01, and made selections in November 1999. Four instrument suites were selected, as follows:

- Sun Earth Connection Coronal and Heliospheric Investigation (SECCHI) comprised of five instruments and led by Dr. Russell Howard of the Naval Research Laboratory;
- In Situ Measurement of Particles & Coronal Mass Ejection Transients (IMPACT) comprised of four instruments and led by Dr. Janet Luhmann from the University of California at Berkeley;
- SWAVES: Solar Terrestrial Relationship Observatory/Waves comprised of three instruments and led by Dr. Jean Louis H. Bougeret from the Centre National de la Recherche Scientifique Observatoire de Paris; and,
- Plasma and Suprathermal Ion and Composition (PLASTIC) led by Dr. Antoinette Galvin from the University of New Hampshire.

Co-Investigators from three German institutions were selected to provide portions of instruments for the SECCHI, IMPACT, and PLASTIC suites as follows.

- The University of Kiel was selected to provide the Solar Electron Proton Telescope (SEPT) detectors for the Solar Energetic Particles (SEP) package in the IMPACT instrument suite and the doors for the white light inner (COR1) and outer (COR2) coronagraphs and Extreme Ultraviolet Imager (EUVI) instrument in the SECCHI instrument suite.
- The Max Planck Institut für Aeronomie was selected to provide the time-of-flight electronics for the Suprathermal Ion Telescope (SIT) detectors that are part of the SEP package and the engineering support for the SECCHI doors being fabricated by the University of Kiel.
- The Max Planck Institut für Extraterrestrische Physik (MPE) was selected to provide the following for the PLASTIC instrument suite: the Time-to-Amplitude Converter (TAC) boards; the carbon foils; the nickel grids; the vibration dampers; and, the test facility and personnel to perform vibration qualification for PLASTIC instrument suite.

Pursuant to this Letter of Agreement, and within the context of the German involvement noted above, DLR will use reasonable efforts to carry out the following responsibilities:

1. Provide the design, fabrication, and delivery of SEPT detectors for the SEP package in the IMPACT instrument suite on each of two identically-instrumented spacecraft;
2. Provide the design, fabrication, delivery and integration of time-of-flight electronics for the SIT, a part of the SEP package in the IMPACT instrument suite on each of two identically-instrumented spacecraft;
3. Provide the assembly, integration, and checkout of the SEPT, part of the SEP package in the IMPACT instrument suite on each of two identically-instrumented spacecraft;
4. Provide interface documentation (data, thermal, mechanical, electrical, etc.) to support the development, integration, and testing of the SEPT instrument into the SEP package in the IMPACT instrument suite;

5. Provide the design, fabrication, qualification, delivery and integration of doors for the COR1 and COR2 coronagraphs and EUVI instrument, part of the SECCHI instrument suite on each of two identically-instrumented spacecraft;
6. Provide the design, fabrication, and delivery of door mechanisms for the COR1, COR2, and EUVI instruments, part of the SECCHI instrument suite on each of two identically-instrumented spacecraft;
7. Provide the design, fabrication, and delivery of TAC boards, carbon foils, nickel grids, and vibration dampers for the PLASTIC instrument on each of two identically-instrumented spacecraft and one flight spare;
8. Provide the use of the Vibration Test Facility and personnel at the MPE to support the vibration qualification of the PLASTIC instrument suite;
9. Provide the ground support equipment to support the integration, assembly, and test of DLR contributions to the SECCHI instrument suite and integration of the PLASTIC instrument suite onto the STEREO spacecraft;
10. Provide appropriate spare parts, design and interface drawings, documentation, calibration, electrical harnesses, purge plumbing, engineering models, and simulators as required for DLR contributions to the IMPACT, SECCHI, and PLASTIC instrument suites;
11. Participate in the definition and development of performance requirements and interfaces;
12. Provide support for DLR Co-Investigators during development and mission operations;
13. Support participation in the Science Working Group, the STEREO spacecraft and instrument meetings, and post-launch mission operations and data analyses; and,
14. Report on the schedule and performance of DLR contributions to the respective STEREO instrument leads.

NASA will use reasonable efforts to carry out the following responsibilities:

1. Provide overall project management for the STEREO mission;
2. Design and build the STEREO spacecraft;
3. Provide functional requirements for the following DLR-provided hardware: the SEPT detectors for the SEP package in the IMPACT instrument suite; the doors and door mechanisms for the COR1, COR2, and EUVI instruments in the SECCHI instrument suite; the time-of-flight electronics for the SIT that is a part of the SEP package; the assembly, test, and integration of the SEPT detectors for the SEP package in the IMPACT instrument suite; and, the TAC boards, carbon foils, nickel grids, and vibration dampers for the PLASTIC instrument suite;
4. Provide interface (electrical, mechanical, software) specifications for DLR-provided hardware as given in item #3 of the NASA responsibilities;
5. Provide performance assurance requirements to DLR-funded investigators;
6. Manage DLR-provided hardware and software contributions delivered to the United States of America (U.S.);
7. Provide the PLASTIC and SECCHI Data Processing Unit (DPU) Flight Unit and/or Simulator to DLR-funded investigators for testing with DLR-provided instruments as required;

8. Provide the DPU-to-spacecraft interface information for the PLASTIC instrument suite;
9. Provide necessary SECCHI, and PLASTIC U.S. hardware to DLR-funded investigators for integration with, and testing of DLR-provided equipment;
10. Provide final assembly and testing of the IMPACT, SECCHI, and PLASTIC instrument suites;
11. Assure that DLR-funded Co-Investigators will have full rights to the STEREO data in accordance with the NASA Science Management Plan for STEREO;
12. Release science data in a manner consistent with NASA STEREO science data policy;
13. Launch the STEREO spacecraft; and,
14. Manage flight operations and testing and post-launch data analysis.

NASA and DLR (the Parties) will provide on occasion, as mutally agreed, for personnel from NASA and the DLR-funded institutions to visit one another's facilities to participate in integration and testing, and to observe, confer and advise the other Party in regard to aspects of design and development of compatible instrument interfaces, integration, and testing.

POINTS OF CONTACT

The NASA point-of-contact for this program is:

Ms. Vicki Elsbernd
Program Executive
Flight Programs Division
Office of Space Science, Code SD
NASA Headquarters
Washington, DC 20546
Telephone: 202-358-2499
Facsimile: 202-358-3096

The NASA Goddard Space Flight Center point-of-contact for this mission is:

Ms. Abigail Harper
Project Manager
Solar Terrestrial Program Office, Mail Code 460.0
NASA Goddard Space Flight Center
Greenbelt, MD 20771
Telephone: 301-286-5897
Facsimile: 301-286-1696

The IMPACT Principal Investigator is:

Dr. Janet Luhmann
University of California, Berkeley
Space Sciences Laboratory
Centennial Drive at Grizzly Peak Boulevard
Berkeley, CA 94720
Telephone: 510-642-2545
Facsimile: 510-643-8302

The SEP package point-of-contact is:

Dr. Tycho von Rosinvinge
Co-Investigator
Mail Code 661.0
NASA Goddard Space Flight Center
Greenbelt, MD 20771
Telephone: 301-286-6721
Facsimile: 301-286-1682

The SECCHI Principal Investigator is:

Dr. Russell Howard
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Code 7660
4555 Overlook Avenue SW
Washington, DC 20375-5352
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Facsimile: 202-767-5636

The PLASTIC Principal Investigator is:

Dr. Antoinette Galvin
University of New Hampshire
EOS, Space Science Center
Morse Hall, Room 318
Durham, NH 03824-3525
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DLR points-of-contact for this program are:

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The points-of-contact at the Max Planck Institut für Aeronomie are:

Dr. Axel Korth
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Prof. Rainer Schwenn
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Dr. Volker Bothmer
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The point-of-contact at the Max Planck Institut für Extraterrestrische Physik is:

Dr. Berndt Klecker
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Germany
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Facsimile: 49 89 30000 3569

The points-of-contact at the University of Kiel are:

Dr. Reinhold Mueller-Mellin
Institut für Experimentelle und Angewandte Physik
University of Kiel
24118 Kiel
Germany
Telephone: 49 431 880 3227
Facsimile: 49 431 85660

Mr. Horst Kunow
Institut für Experimentelle und Angewandte Physik
University of Kiel
24118 Kiel
Germany
Telephone: 49 431 880 2487
Facsimile: 49 431 85660

FINANCIAL ARRANGEMENTS

Each Party will bear the costs of discharging its respective responsibilities, including travel and subsistence of its own personnel and transportation of all equipment for which it is responsible. It is understood that the ability of the Parties to carry out their obligations is subject to the availability of funds.

DATA RIGHTS

The Parties have access to and use of the scientific data generated under this Agreement. In accordance with criteria established in the NASA solicitation for science participation in the STEREO mission, the STEREO data will be treated as a public resource and will be made available for public access as soon as is practical. After the initial check out and calibration period of approximately 3 months after initial operation, the STEREO database and requisite basic analysis software will be made available to the international community through a NASA data center. After the initial period, the data will be made public with no more than a two-month delay.

EXCHANGE OF TECHNICAL DATA AND GOODS

The Parties are obligated to transfer only those technical data (including software) and goods necessary to fulfill their respective responsibilities under this Agreement, in accordance with the following provisions:

1. The transfer of technical data for the purpose of discharging the Parties' responsibilities with regard to interface, integration, and safety shall normally be made without restriction, except as required by national laws and regulations relating to export control or the control of classified data. If design, manufacturing, and processing data and associated software, which is proprietary but not export controlled, is necessary for interface, integration, or safety purposes, the transfer shall be made and the data and associated software shall be appropriately marked.

2. All transfers of proprietary technical data and export-controlled goods and technical data are subject to the following provisions. In the event a Party finds it necessary to transfer goods which are subject to export controls or technical data which is proprietary or subject to export control, and for which protection is to be maintained, such goods shall be specifically identified and such technical data shall be marked with a notice to indicate that they shall be used and disclosed by the receiving Party and its related entities (e.g., contractors and subcontractors) only for the purposes of fulfilling the receiving Party's responsibilities under the programs implemented by this Agreement, and that the identified goods and marked technical data shall not be disclosed or retransferred to any other entity without the prior written permission of the furnishing Party. The receiving Party agrees to abide by the terms of the notice, and to protect any such identified goods and marked technical data from unauthorized use and disclosure, and also agrees to obtain these same obligations from its related entities prior to the transfer.

3. All goods, marked proprietary data, and marked or unmarked technical data subject to export control, which is transferred under this Agreement, shall be used by the receiving Party exclusively for the purposes of the programs implemented by this Agreement.

4. Title to all hardware to be exchanged under this Agreement will be retained by the Party providing the item.

INVENTION AND PATENT RIGHTS

Nothing in this Agreement shall be construed as granting or implying any rights to, or interest in, patents or inventions of the Parties or their contractors or subcontractors. In the event that an invention is jointly made by employees of the Parties, their contractors or subcontractors, during the implementation of this agreement, the Parties shall consult and agree as to the responsibilities and costs of actions to be taken to establish and maintain patent protection (in any country) for such invention and on the terms and

conditions of any license or other rights to be exchanged or granted by or between the parties.

LIABILITY AND RISK OF LOSS

With regard to activities undertaken pursuant to this Agreement, neither Party shall make any claim against the other, employees of the other, the other's related entities (e.g., contractors, subcontractors, investigators, or their contractors or subcontractors), or employees of its related entities for any injury to or death of its own employees or employees of its related entities, or for damage to or loss of its own property or that of its related entities, whether such injury, death, damage or loss arises through negligence or otherwise.

The Parties further agree to use all reasonable efforts to extend this provision as set forth above to their own related entities by requiring them, by contract or otherwise, to waive all claims against the other Party and its related entities against any claim for injury, death, damage or loss arising from activities undertaken pursuant to this Agreement.

This cross-waiver of liability shall not be applicable to:

1. Claims between a Party and its own related entity or between its own related entities;

2. Claims made by a natural person, his/her estate, survivors or subrogees for bodily injury, other impairment of health, or death of such natural person;

3. Claims for damage caused by willful misconduct;

4. Intellectual property claims;

5. Claims for damage based upon a failure of the Parties to extend the provision as set forth above or from a failure of the Parties to ensure that their related entities extend the provision as set forth above; or

6. Contract claims between the Parties based on express contractual provisions.

Nothing in this section shall be construed to create the basis for a claim or suit where none would otherwise exist.

CUSTOMS CLEARANCE

In accordance with its laws and regulations, each Party shall facilitate free customs clearance of equipment and data required for this project. In the event that any customs duty, fees and/or taxes of any kind are levied by the governments of the Parties on the equipment and related goods for the execution of this Agreement, and after seeking the necessary free customs clearance and waiver of applicable customs duties and taxes, such

customs duty, fees and/or taxes shall be borne by the Party of the country levying the customs duty, fees and/or taxes. Such arrangements shall be reciprocal and in accordance with the respective national laws and regulations of the Parties.

PUBLIC INFORMATION

Release of public information regarding this program may be made by the appropriate agency for its own portion of the program as desired and, insofar as participation of the other is involved, after suitable consultation.

CONSULTATIONS/SETTLEMENT OF DISPUTES

The Parties shall consult promptly with each other on all issues involving interpretation or implementation of this MOU, implementing arrangement and resulting annexes as specified.

Any matter that has not been settled in accordance with the above paragraph shall be referred to the NASA Program Executive and the appropriate DLR point of contact listed above. These program managers will attempt to resolve all issues arising from the implementation of this agreement. If they are unable to come to agreement on any issue, then the dispute will be referred to the agreement signatories, or their designated representatives for joint resolution. If the Parties are unable to resolve the dispute, the NASA signatory will issue a final written decision on behalf of NASA.

MISHAP INVESTIGATIONS

In the case of a mishap or mission failure, the Parties agree to provide assistance to each other in the conduct of any investigation. In the case of activities which might result in the death of, or serious injury to persons, or substantial loss of, or damage to property as a result of activities under this agreement, the Parties agree to establish a process for investigating each such mishap as part of their program/project implementation agreements.

ENTRY INTO FORCE AND TERMINATION

This Letter of Agreement will go into effect upon the date of DLR's affirmative reply. It will remain in force until the two STEREO spacecraft are on-orbit and operating for 2 years, or December 31, 2007, whichever is earlier. It may be extended or amended by mutual written agreement of the Parties. This Agreement can be terminated by NASA or DLR after six months' written notice of its intention to terminate the Agreement.

If the above terms and conditions are acceptable to DLR, we propose that this letter, together with your affirmative reply, document our joint understanding as to the implementation of this cooperative effort.

Sincerely,

P. Diane Rausch
Director
Space Science and Aeronautics Division
Office of External Relations